



The Icemen cometh. (l. to r.) Hans Oeschger, Claude Lorius, and Willi Dansgaard were awarded the 1996 Tyler Prize for their documentation of climate change through analysis of ice.

Graph source: Neftel A, Moor E, Oeschger H, Stauffer B. Evidence from polar ice cores for the increase in atmospheric CO₂ in the past two centuries. *Nature* 315(May 2):45-46 (1985). MacMillan Magazines Ltd.

optimistic. "I do feel positive, but we acknowledge that these results are preliminary," Grant said. "We consider the results extremely encouraging, but as enthusiastic as we are, we all agree that we have not proven [the vaccine's efficacy]." Grant said that from a scientific standpoint, "only a rigorously controlled trial" can prove the effectiveness of the vaccine.

The researchers are also hoping to use the vaccine to treat melanoma. Preliminary tests on patients with melanoma, led by Paul Chapman of the clinical immunology service at MSKCC, have been promising, and a phase-3 trial is being planned, Grant said.

Climate Change Researchers Capture Tyler Prize

Three scientists whose work has documented more than 150,000 years of global climate change through the collection and analysis of glacier and polar ice have been awarded the 1996 Tyler Prize for Environmental Achievement. Willi Dansgaard of the University of Copenhagen, Claude Lorius of the French Institute of Polar Research and Technology, and Hans Oeschger of the University of Bern shared a cash prize of \$150,000 and received gold medallions at an awards dinner in Los Angeles.

Preserved within the great polar ice caps is a remarkable record of the earth's climate extending back hundreds of thousands of years. Encased within the caps are carbon dioxide and other gases, the dust of numerous volcanic eruptions, evidence of fierce global storms, and other traces of cli-

mate change deposited during the span of human existence.

"The composition of the ice itself tells us about the temperature and atmospheric conditions at the time the ice was formed," said Dansgaard. "So going deep into the ice is like sticking a thermometer backwards in time." Searching for clues to the earth's climatic history through the study of ancient ice was a revolutionary idea when first proposed in the 1950s. Today, it is the foundation of global climate research. "Data from this work is used in virtually all scientific studies and reports about global warming to emphasize the potential of atmospheric pollution to adversely affect climate," said Robert P. Sullivan, chair of the Tyler Prize Executive Committee, which annually selects the prize winners.

The first polar deep ice core drilling field expedition took place in 1966 in Greenland. Since that time, additional samples have been retrieved from Norway and Antarctica. Drilling, involving international teams of scientists, takes place under some of the most extreme weather conditions on earth. The cores are less than 4 inches in diameter and can measure more than a mile in length.

Once removed from the field, it often takes decades of laboratory analysis to unlock the oxygen isotopes and other traces of ancient atmospheres trapped for millennia in the ice. The result of the researchers' painstaking work is a detailed look back in time. Of particular interest to environmental scientists has been the reconstruction of atmospheric carbon dioxide and methane levels during the last 300

years, which shows a strong relationship between global climate and the chemical composition of the atmosphere. This data provides the most dramatic and convincing evidence of global warming tied to human activities.

The Tyler Prize was established in 1973 by Los Angeles philanthropists John and Alice Tyler as an international award honoring significant scientific achievements in all disciplines of environmental research and environmental protection. Through their work, Tyler laureates have focused worldwide attention on environmental problems and motivated effective action toward solutions. Three past Tyler Prize winners have subsequently been awarded the Nobel Prize in Chemistry.

The 11-member Tyler Prize Executive Committee comprises esteemed environmental scientists, several of whom are past Tyler Prize recipients. The Tyler Prize is administered by the University of Southern California.

Assessing Free Radical Damage

Free radicals have developed a bad reputation, in the scientific and popular press but recent research shows how difficult a causal relationship between free radicals and disease may be to prove. Free radicals are unstable oxygen molecules that can interact with proteins, carbohydrates, lipids, and DNA, and thereby can have diverse effects on cellular function. Although some evidence points in the direction of free radicals as a culprit in a multitude of diseases, including cancer, cardiovascular disease, and Alzheimer's disease, a direct causal relationship in human beings has yet to be established. A primary reason for this is that the generation of free radicals in human beings has been difficult to measure. Free radical damage has been statistically inferred, measured by *in vitro* testing, and implicated in autopsy results, but never established in living humans. This has also made it "difficult to identify drugs or vitamins that may act as antioxidants to combat the effect of free radicals, and therefore, to identify appropriate doses which could be assessed in clinical trials," says Garret FitzGerald, chairman of the department of pharmacology and a professor of cardiovascular medicine at the University of Pennsylvania Medical Center, Philadelphia.

However, in a recent study, FitzGerald and his colleagues were able to noninvasively measure the effects of free radicals on the human body. The study was reported in the 1 July 1996 issue of *Circulation*, a journal of the American Heart Association.